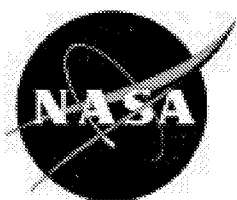


NASA/SP—1999-7011/SUPPL482
January 11, 1999

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES



National Aeronautics and
Space Administration
Langley Research Center
**Scientific and Technical
Information Program Office**

The NASA STI Program Office . . . in Profile

Since its founding, NASA has been dedicated to the advancement of aeronautics and space science. The NASA Scientific and Technical Information (STI) Program Office plays a key part in helping NASA maintain this important role.

The NASA STI Program Office is operated by Langley Research Center, the lead center for NASA's scientific and technical information. The NASA STI Program Office provides access to the NASA STI Database, the largest collection of aeronautical and space science STI in the world. The Program Office is also NASA's institutional mechanism for disseminating the results of its research and development activities. These results are published by NASA in the NASA STI Report Series, which includes the following report types:

- **TECHNICAL PUBLICATION.** Reports of completed research or a major significant phase of research that present the results of NASA programs and include extensive data or theoretical analysis. Includes compilations of significant scientific and technical data and information deemed to be of continuing reference value. NASA's counterpart of peer-reviewed formal professional papers but has less stringent limitations on manuscript length and extent of graphic presentations.
- **TECHNICAL MEMORANDUM.** Scientific and technical findings that are preliminary or of specialized interest, e.g., quick release reports, working papers, and bibliographies that contain minimal annotation. Does not contain extensive analysis.
- **CONTRACTOR REPORT.** Scientific and technical findings by NASA-sponsored contractors and grantees.

- **CONFERENCE PUBLICATION.** Collected papers from scientific and technical conferences, symposia, seminars, or other meetings sponsored or cosponsored by NASA.
- **SPECIAL PUBLICATION.** Scientific, technical, or historical information from NASA programs, projects, and missions, often concerned with subjects having substantial public interest.
- **TECHNICAL TRANSLATION.** English-language translations of foreign scientific and technical material pertinent to NASA's mission.

Specialized services that complement the STI Program Office's diverse offerings include creating custom thesauri, building customized databases, organizing and publishing research results . . . even providing videos.

For more information about the NASA STI Program Office, see the following:

- Access the NASA STI Program Home Page at [*http://www.sti.nasa.gov*](http://www.sti.nasa.gov)
- E-mail your question via the Internet to [*help@sti.nasa.gov*](mailto:help@sti.nasa.gov)
- Fax your question to the NASA STI Help Desk at (301) 621-0134
- Telephone the NASA STI Help Desk at (301) 621-0390
- Write to:
NASA STI Help Desk
NASA Center for AeroSpace Information
7121 Standard Drive
Hanover, MD 21076-1320

Introduction

This supplemental issue of *Aerospace Medicine and Biology, A Continuing Bibliography with Indexes* (NASA/SP—1999-7011) lists reports, articles, and other documents recently announced in the NASA STI Database.

In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which humans are subjected during and following simulated or actual flight in the Earth's atmosphere or in interplanetary space. References describing similar effects on biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. Applied research receives the most emphasis, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.

Each entry in the publication consists of a standard bibliographic citation accompanied, in most cases, by an abstract.

The NASA CASI price code table, addresses of organizations, and document availability information are included before the abstract section.

Two indexes—subject and author are included after the abstract section.

SCAN Goes Electronic!

If you have electronic mail or if you can access the Internet, you can view biweekly issues of *SCAN* from your desktop absolutely free!

Electronic SCAN takes advantage of computer technology to inform you of the latest worldwide, aerospace-related, scientific and technical information that has been published.

No more waiting while the paper copy is printed and mailed to you. You can view *Electronic SCAN* the same day it is released—up to 191 topics to browse at your leisure. When you locate a publication of interest, you can print the announcement. You can also go back to the *Electronic SCAN* home page and follow the ordering instructions to quickly receive the full document.

Start your access to *Electronic SCAN* today. Over 1,000 announcements of new reports, books, conference proceedings, journal articles...and more—available to your computer every two weeks.

**Timely
Flexible
Complete
FREE!**

For Internet access to *E-SCAN*, use any of the following addresses:

<http://www.sti.nasa.gov>

[ftp.sti.nasa.gov](ftp://sti.nasa.gov)

[gopher.sti.nasa.gov](gopher://sti.nasa.gov)

To receive a free subscription, send e-mail for complete information about the service first. Enter **scan@sti.nasa.gov** on the address line. Leave the subject and message areas blank and send. You will receive a reply in minutes.

Then simply determine the *SCAN* topics you wish to receive and send a second e-mail to **listserve@sti.nasa.gov**. Leave the subject line blank and enter a subscribe command in the message area formatted as follows:

Subscribe <desired list> <Your name>

For additional information, e-mail a message to **help@sti.nasa.gov**.

Phone: (301) 621-0390

Fax: (301) 621-0134

Write: NASA STI Help Desk
NASA Center for AeroSpace Information
7121 Standard Drive
Hanover, MD 21076-1320

Looking just for *Aerospace Medicine and Biology* reports?

Although hard copy distribution has been discontinued, you can still receive these vital announcements through your *E-SCAN* subscription. Just **subscribe SCAN-AEROMED** in the message area of your e-mail to **listserve@sti.nasa.gov**.



Table of Contents

Records are arranged in categories 51 through 55, the Life Sciences division of *STAR*. Selecting a category will link you to the collection of records cited in this issue pertaining to that category.

51	Life Sciences (General)	1
52	Aerospace Medicine Includes physiological factors; biological effects of radiation; and effects of weightlessness on man and animals.	3
53	Behavioral Sciences Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.	6
54	Man/System Technology and Life Support Includes human engineering; biotechnology; and space suits and protective clothing.	7
55	Space Biology Includes exobiology; planetary biology; and extraterrestrial life.	11

Indexes

Two indexes are available. You may use the find command under the tools menu while viewing the PDF file for direct match searching on any text string. You may also view the indexes provided, for searching on *NASA Thesaurus* subject terms and author names.

Subject Term Index	ST-1
Author Index	PA-1

Selecting an index above will link you to that comprehensive listing.

Document Availability

Select **Availability Info** for important information about NASA Scientific and Technical Information (STI) Program Office products and services, including registration with the NASA Center for Aerospace Information (CASI) for access to the NASA CASI TRS (Technical Report Server), and availability and pricing information for cited documents.

The New NASA Video Catalog is Here

To order your **Free!** copy,
call the NASA STI Help Desk at
(301) 621-0390,

fax to

(301) 621-0134,

e-mail to

help@sti.nasa.gov,

or visit the NASA STI Program

homepage at

<http://www.sti.nasa.gov>

(Select STI Program Bibliographic Announcements)

Explore the Universe!

Document Availability Information

The mission of the NASA Scientific and Technical (STI) Program Office is to quickly, efficiently, and cost-effectively provide the NASA community with desktop access to STI produced by NASA and the world's aerospace industry and academia. In addition, we will provide the aerospace industry, academia, and the taxpayer access to the intellectual scientific and technical output and achievements of NASA.

Eligibility and Registration for NASA STI Products and Services

The NASA STI Program offers a wide variety of products and services to achieve its mission. Your affiliation with NASA determines the level and type of services provided by the NASA STI Program. To assure that appropriate level of services are provided, NASA STI users are requested to register at the NASA Center for AeroSpace Information (CASI). Please contact NASA CASI in one of the following ways:

E-mail: help@sti.nasa.gov
Fax: 301-621-0134
Phone: 301-621-0390
Mail: ATTN: Registration Services
NASA Center for AeroSpace Information
7121 Standard Drive
Hanover, MD 21076-1320

Limited Reproducibility

In the database citations, a note of limited reproducibility appears if there are factors affecting the reproducibility of more than 20 percent of the document. These factors include faint or broken type, color photographs, black and white photographs, foldouts, dot matrix print, or some other factor that limits the reproducibility of the document. This notation also appears on the microfiche header.

NASA Patents and Patent Applications

Patents and patent applications owned by NASA are announced in the STI Database. Printed copies of patents (which are not microfiched) are available for purchase from the U.S. Patent and Trademark Office.

When ordering patents, the U.S. Patent Number should be used, and payment must be remitted in advance, by money order or check payable to the Commissioner of Patents and Trademarks. Prepaid purchase coupons for ordering are also available from the U.S. Patent and Trademark Office.

NASA patent application specifications are sold in both paper copy and microfiche by the NASA Center for AeroSpace Information (CASI). The document ID number should be used in ordering either paper copy or microfiche from CASI.

The patents and patent applications announced in the STI Database are owned by NASA and are available for royalty-free licensing. Requests for licensing terms and further information should be addressed to:

National Aeronautics and Space Administration
Associate General Counsel for Intellectual Property
Code GP
Washington, DC 20546-0001

Sources for Documents

One or more sources from which a document announced in the STI Database is available to the public is ordinarily given on the last line of the citation. The most commonly indicated sources and their acronyms or abbreviations are listed below, with an Addresses of Organizations list near the back of this section. If the publication is available from a source other than those listed, the publisher and his address will be displayed on the availability line or in combination with the corporate source.

Avail: NASA CASI. Sold by the NASA Center for AeroSpace Information. Prices for hard copy (HC) and microfiche (MF) are indicated by a price code following the letters HC or MF in the citation. Current values are given in the NASA CASI Price Code Table near the end of this section.

Note on Ordering Documents: When ordering publications from NASA CASI, use the document ID number or other report number. It is also advisable to cite the title and other bibliographic identification.

Avail: SOD (or GPO). Sold by the Superintendent of Documents, U.S. Government Printing Office, in hard copy.

Avail: BLL (formerly NLL): British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. Photocopies available from this organization at the price shown. (If none is given, inquiry should be addressed to the BLL.)

Avail: DOE Depository Libraries. Organizations in U.S. cities and abroad that maintain collections of Department of Energy reports, usually in microfiche form, are listed in Energy Research Abstracts. Services available from the DOE and its depositories are described in a booklet, *DOE Technical Information Center—Its Functions and Services* (TID-4660), which may be obtained without charge from the DOE Technical Information Center.

Avail: ESDU. Pricing information on specific data, computer programs, and details on ESDU International topic categories can be obtained from ESDU International.

Avail: Fachinformationszentrum Karlsruhe. Gesellschaft für wissenschaftlich-technische Information mbH 76344 Eggenstein-Leopoldshafen, Germany.

- Avail: HMSO. Publications of Her Majesty's Stationery Office are sold in the U.S. by Pendragon House, Inc. (PHI), Redwood City, CA. The U.S. price (including a service and mailing charge) is given, or a conversion table may be obtained from PHI.
- Avail: Issuing Activity, or Corporate Author, or no indication of availability. Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.
- Avail: NASA Public Document Rooms. Documents so indicated may be examined at or purchased from the National Aeronautics and Space Administration (JBD-4), Public Documents Room (Room 1H23), Washington, DC 20546-0001, or public document rooms located at NASA installations, and the NASA Pasadena Office at the Jet Propulsion Laboratory.
- Avail: NTIS. Sold by the National Technical Information Service. Initially distributed microfiche under the NTIS SRIM (Selected Research in Microfiche) are available. For information concerning this service, consult the NTIS Subscription Section, Springfield, VA 22161.
- Avail: Univ. Microfilms. Documents so indicated are dissertations selected from Dissertation Abstracts and are sold by University Microfilms as xerographic copy (HC) and microfilm. All requests should cite the author and the Order Number as they appear in the citation.
- Avail: US Patent and Trademark Office. Sold by Commissioner of Patents and Trademarks, U.S. Patent and Trademark Office, at the standard price of \$1.50 each, postage free.
- Avail: (US Sales Only). These foreign documents are available to users within the United States from the National Technical Information Service (NTIS). They are available to users outside the United States through the International Nuclear Information Service (INIS) representative in their country, or by applying directly to the issuing organization.
- Avail: USGS. Originals of many reports from the U.S. Geological Survey, which may contain color illustrations, or otherwise may not have the quality of illustrations preserved in the microfiche or facsimile reproduction, may be examined by the public at the libraries of the USGS field offices whose addresses are listed on the Addresses of Organizations page. The libraries may be queried concerning the availability of specific documents and the possible utilization of local copying services, such as color reproduction.

Addresses of Organizations

British Library Lending Division
Boston Spa, Wetherby, Yorkshire
England

Commissioner of Patents and Trademarks
U.S. Patent and Trademark Office
Washington, DC 20231

Department of Energy
Technical Information Center
P.O. Box 62
Oak Ridge, TN 37830

European Space Agency–
Information Retrieval Service ESRIN
Via Galileo Galilei
00044 Frascati (Rome) Italy

ESDU International
27 Corsham Street
London
N1 6UA
England

Fachinformationszentrum Karlsruhe
Gesellschaft für wissenschaftlich–technische
Information mbH
76344 Eggenstein–Leopoldshafen, Germany

Her Majesty's Stationery Office
P.O. Box 569, S.E. 1
London, England

NASA Center for AeroSpace Information
7121 Standard Drive
Hanover, MD 21076-1320

(NASA STI Lead Center)
National Aeronautics and Space Administration
Scientific and Technical Information Program Office
Langley Research Center – MS157
Hampton, VA 23681

National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161

Pendragon House, Inc.
899 Broadway Avenue
Redwood City, CA 94063

Superintendent of Documents
U.S. Government Printing Office
Washington, DC 20402

University Microfilms
A Xerox Company
300 North Zeeb Road
Ann Arbor, MI 48106

University Microfilms, Ltd.
Tylers Green
London, England

U.S. Geological Survey Library National Center
MS 950
12201 Sunrise Valley Drive
Reston, VA 22092

U.S. Geological Survey Library
2255 North Gemini Drive
Flagstaff, AZ 86001

U.S. Geological Survey
345 Middlefield Road
Menlo Park, CA 94025

U.S. Geological Survey Library
Box 25046
Denver Federal Center, MS914
Denver, CO 80225

NASA CASI Price Code Table

(Effective July 1, 1998)

U.S., Canada, Code & Mexico Foreign			U.S., Canada, Code & Mexico Foreign		
A01	..... \$ 8.00	..... \$ 16.00	E01	..... \$101.00	..... \$202.00
A02	..... 12.00	..... 24.00	E02	..... 109.50	..... 219.00
A03	..... 23.00	..... 46.00	E03	..... 119.50	..... 238.00
A04	..... 25.50	..... 51.00	E04	..... 128.50	..... 257.00
A05	..... 27.00	..... 54.00	E05	..... 138.00	..... 276.00
A06	..... 29.50	..... 59.00	E06	..... 146.50	..... 293.00
A07	..... 33.00	..... 66.00	E07	..... 156.00	..... 312.00
A08	..... 36.00	..... 72.00	E08	..... 165.50	..... 331.00
A09	..... 41.00	..... 82.00	E09	..... 174.00	..... 348.00
A10	..... 44.00	..... 88.00	E10	..... 183.50	..... 367.00
A11	..... 47.00	..... 94.00	E11	..... 193.00	..... 386.00
A12	..... 51.00	..... 102.00	E12	..... 201.00	..... 402.00
A13	..... 54.00	..... 108.00	E13	..... 210.50	..... 421.00
A14	..... 56.00	..... 112.00	E14	..... 220.00	..... 440.00
A15	..... 58.00	..... 116.00	E15	..... 229.50	..... 459.00
A16	..... 60.00	..... 120.00	E16	..... 238.00	..... 476.00
A17	..... 62.00	..... 124.00	E17	..... 247.50	..... 495.00
A18	..... 65.50	..... 131.00	E18	..... 257.00	..... 514.00
A19	..... 67.50	..... 135.00	E19	..... 265.50	..... 531.00
A20	..... 69.50	..... 139.00	E20	..... 275.00	..... 550.00
A21	..... 71.50	..... 143.00	E21	..... 284.50	..... 569.00
A22	..... 77.00	..... 154.00	E22	..... 293.00	..... 586.00
A23	..... 79.00	..... 158.00	E23	..... 302.50	..... 605.00
A24	..... 81.00	..... 162.00	E24	..... 312.00	..... 624.00
A25	..... 83.00	..... 166.00	E99	Contact NASA CASI	
A99	Contact NASA CASI				

Payment Options

All orders must be prepaid unless you are registered for invoicing or have a deposit account with the NASA CASI. Payment can be made by VISA, MasterCard, American Express, or Diner's Club credit card. Checks or money orders must be in U.S. currency and made payable to "NASA Center for AeroSpace Information." To register, please request a registration form through the NASA STI Help Desk at the numbers or addresses below.

Handling fee per item is \$1.50 domestic delivery to any location in the United States and \$9.00 foreign delivery to Canada, Mexico, and other foreign locations. Video orders incur an additional \$2.00 handling fee per title.

The fee for shipping the safest and fastest way via Federal Express is in addition to the regular handling fee explained above—\$5.00 domestic per item, \$27.00 foreign for the first 1-3 items, \$9.00 for each additional item.

Return Policy

The NASA Center for AeroSpace Information will replace or make full refund on items you have requested if we have made an error in your order, if the item is defective, or if it was received in damaged condition, and you contact CASI within 30 days of your original request.

NASA Center for AeroSpace Information
7121 Standard Drive
Hanover, MD 21076-1320

E-mail: help@sti.nasa.gov
Fax: (301) 621-0134
Phone: (301) 621-0390

Federal Depository Library Program

In order to provide the general public with greater access to U.S. Government publications, Congress established the Federal Depository Library Program under the Government Printing Office (GPO), with 53 regional depositories responsible for permanent retention of material, inter-library loan, and reference services. At least one copy of nearly every NASA and NASA-sponsored publication, either in printed or microfiche format, is received and retained by the 53 regional depositories. A list of the Federal Regional Depository Libraries, arranged alphabetically by state, appears at the very end of this section. These libraries are not sales outlets. A local library can contact a regional depository to help locate specific reports, or direct contact may be made by an individual.

Public Collection of NASA Documents

An extensive collection of NASA and NASA-sponsored publications is maintained by the British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England for public access. The British Library Lending Division also has available many of the non-NASA publications cited in the STI Database. European requesters may purchase facsimile copy or microfiche of NASA and NASA-sponsored documents FIZ–Fachinformation Karlsruhe–Bibliographic Service, D-76344 Eggenstein-Leopoldshafen, Germany and TIB–Technische Informationsbibliothek, P.O. Box 60 80, D-30080 Hannover, Germany.

Submitting Documents

All users of this abstract service are urged to forward reports to be considered for announcement in the STI Database. This will aid NASA in its efforts to provide the fullest possible coverage of all scientific and technical publications that might support aeronautics and space research and development. If you have prepared relevant reports (other than those you will transmit to NASA, DOD, or DOE through the usual contract- or grant-reporting channels), please send them for consideration to:

ATTN: Acquisitions Specialist
NASA Center for AeroSpace Information
7121 Standard Drive
Hanover, MD 21076-1320.

Reprints of journal articles, book chapters, and conference papers are also welcome.

You may specify a particular source to be included in a report announcement if you wish; otherwise the report will be placed on a public sale at the NASA Center for AeroSpace Information. Copyrighted publications will be announced but not distributed or sold.

Federal Regional Depository Libraries

ALABAMA

AUBURN UNIV. AT MONTGOMERY LIBRARY

Documents Dept.
7300 University Dr.
Montgomery, AL 36117-3596
(205) 244-3650 Fax: (205) 244-0678

UNIV. OF ALABAMA

Amelia Gayle Gorgas Library
Govt. Documents
P.O. Box 870266
Tuscaloosa, AL 35487-0266
(205) 348-6046 Fax: (205) 348-0760

ARIZONA

DEPT. OF LIBRARY, ARCHIVES, AND PUBLIC RECORDS

Research Division
Third Floor, State Capitol
1700 West Washington
Phoenix, AZ 85007
(602) 542-3701 Fax: (602) 542-4400

ARKANSAS

ARKANSAS STATE LIBRARY

State Library Service Section
Documents Service Section
One Capitol Mall
Little Rock, AR 72201-1014
(501) 682-2053 Fax: (501) 682-1529

CALIFORNIA

CALIFORNIA STATE LIBRARY

Govt. Publications Section
P.O. Box 942837 - 914 Capitol Mall
Sacramento, CA 94337-0091
(916) 654-0069 Fax: (916) 654-0241

COLORADO

UNIV. OF COLORADO - BOULDER

Libraries - Govt. Publications
Campus Box 184
Boulder, CO 80309-0184
(303) 492-8834 Fax: (303) 492-1881

DENVER PUBLIC LIBRARY

Govt. Publications Dept. BSG
1357 Broadway
Denver, CO 80203-2165
(303) 640-8846 Fax: (303) 640-8817

CONNECTICUT

CONNECTICUT STATE LIBRARY

231 Capitol Avenue
Hartford, CT 06106
(203) 566-4971 Fax: (203) 566-3322

FLORIDA

UNIV. OF FLORIDA LIBRARIES

Documents Dept.
240 Library West
Gainesville, FL 32611-2048
(904) 392-0366 Fax: (904) 392-7251

GEORGIA

UNIV. OF GEORGIA LIBRARIES

Govt. Documents Dept.
Jackson Street
Athens, GA 30602-1645
(706) 542-8949 Fax: (706) 542-4144

HAWAII

UNIV. OF HAWAII

Hamilton Library
Govt. Documents Collection
2550 The Mall
Honolulu, HI 96822
(808) 948-8230 Fax: (808) 956-5968

IDAHO

UNIV. OF IDAHO LIBRARY

Documents Section
Rayburn Street
Moscow, ID 83844-2353
(208) 885-6344 Fax: (208) 885-6817

ILLINOIS

ILLINOIS STATE LIBRARY

Federal Documents Dept.
300 South Second Street
Springfield, IL 62701-1796
(217) 782-7596 Fax: (217) 782-6437

INDIANA

INDIANA STATE LIBRARY

Serials/Documents Section
140 North Senate Avenue
Indianapolis, IN 46204-2296
(317) 232-3679 Fax: (317) 232-3728

IOWA

UNIV. OF IOWA LIBRARIES

Govt. Publications
Washington & Madison Streets
Iowa City, IA 52242-1166
(319) 335-5926 Fax: (319) 335-5900

KANSAS

UNIV. OF KANSAS

Govt. Documents & Maps Library
6001 Malott Hall
Lawrence, KS 66045-2800
(913) 864-4660 Fax: (913) 864-3855

KENTUCKY

UNIV. OF KENTUCKY

King Library South
Govt. Publications/Maps Dept.
Patterson Drive
Lexington, KY 40506-0039
(606) 257-3139 Fax: (606) 257-3139

LOUISIANA

LOUISIANA STATE UNIV.

Middleton Library
Govt. Documents Dept.
Baton Rouge, LA 70803-3312
(504) 388-2570 Fax: (504) 388-6992

LOUISIANA TECHNICAL UNIV.

Prescott Memorial Library
Govt. Documents Dept.
Ruston, LA 71272-0046
(318) 257-4962 Fax: (318) 257-2447

MAINE

UNIV. OF MAINE

Raymond H. Fogler Library
Govt. Documents Dept.
Orono, ME 04469-5729
(207) 581-1673 Fax: (207) 581-1653

MARYLAND

UNIV. OF MARYLAND - COLLEGE PARK

McKeldin Library
Govt. Documents/Maps Unit
College Park, MD 20742
(301) 405-9165 Fax: (301) 314-9416

MASSACHUSETTS

BOSTON PUBLIC LIBRARY

Govt. Documents
666 Boylston Street
Boston, MA 02117-0286
(617) 536-5400, ext. 226
Fax: (617) 536-7758

MICHIGAN

DETROIT PUBLIC LIBRARY

5201 Woodward Avenue
Detroit, MI 48202-4093
(313) 833-1025 Fax: (313) 833-0156

LIBRARY OF MICHIGAN

Govt. Documents Unit
P.O. Box 30007
717 West Allegan Street
Lansing, MI 48909
(517) 373-1300 Fax: (517) 373-3381

MINNESOTA

UNIV. OF MINNESOTA

Govt. Publications
409 Wilson Library
309 19th Avenue South
Minneapolis, MN 55455
(612) 624-5073 Fax: (612) 626-9353

MISSISSIPPI

UNIV. OF MISSISSIPPI

J.D. Williams Library
106 Old Gym Bldg.
University, MS 38677
(601) 232-5857 Fax: (601) 232-7465

MISSOURI

UNIV. OF MISSOURI - COLUMBIA

106B Ellis Library
Govt. Documents Sect.
Columbia, MO 65201-5149
(314) 882-6733 Fax: (314) 882-8044

MONTANA

UNIV. OF MONTANA

Mansfield Library
Documents Division
Missoula, MT 59812-1195
(406) 243-6700 Fax: (406) 243-2060

NEBRASKA

UNIV. OF NEBRASKA - LINCOLN

D.L. Love Memorial Library
Lincoln, NE 68588-0410
(402) 472-2562 Fax: (402) 472-5131

NEVADA

THE UNIV. OF NEVADA LIBRARIES

Business and Govt. Information Center
Reno, NV 89557-0044
(702) 784-6579 Fax: (702) 784-1751

NEW JERSEY

NEWARK PUBLIC LIBRARY

Science Div. - Public Access
P.O. Box 630
Five Washington Street
Newark, NJ 07101-7812
(201) 733-7782 Fax: (201) 733-5648

NEW MEXICO

UNIV. OF NEW MEXICO

General Library
Govt. Information Dept.
Albuquerque, NM 87131-1466
(505) 277-5441 Fax: (505) 277-6019

NEW MEXICO STATE LIBRARY

325 Don Gaspar Avenue
Santa Fe, NM 87503
(505) 827-3824 Fax: (505) 827-3888

NEW YORK

NEW YORK STATE LIBRARY

Cultural Education Center
Documents/Gift & Exchange Section
Empire State Plaza
Albany, NY 12230-0001
(518) 474-5355 Fax: (518) 474-5786

NORTH CAROLINA

UNIV. OF NORTH CAROLINA - CHAPEL HILL

Walter Royal Davis Library
CB 3912, Reference Dept.
Chapel Hill, NC 27514-8890
(919) 962-1151 Fax: (919) 962-4451

NORTH DAKOTA

NORTH DAKOTA STATE UNIV. LIB.

Documents
P.O. Box 5599
Fargo, ND 58105-5599
(701) 237-8886 Fax: (701) 237-7138

UNIV. OF NORTH DAKOTA

Chester Fritz Library
University Station
P.O. Box 9000 - Centennial and University Avenue
Grand Forks, ND 58202-9000
(701) 777-4632 Fax: (701) 777-3319

OHIO

STATE LIBRARY OF OHIO

Documents Dept.
65 South Front Street
Columbus, OH 43215-4163
(614) 644-7051 Fax: (614) 752-9178

OKLAHOMA

OKLAHOMA DEPT. OF LIBRARIES

U.S. Govt. Information Division
200 Northeast 18th Street
Oklahoma City, OK 73105-3298
(405) 521-2502, ext. 253
Fax: (405) 525-7804

OKLAHOMA STATE UNIV.

Edmon Low Library
Stillwater, OK 74078-0375
(405) 744-6546 Fax: (405) 744-5183

OREGON

PORTLAND STATE UNIV.

Branford P. Millar Library
934 Southwest Harrison
Portland, OR 97207-1151
(503) 725-4123 Fax: (503) 725-4524

PENNSYLVANIA

STATE LIBRARY OF PENN.

Govt. Publications Section
116 Walnut & Commonwealth Ave.
Harrisburg, PA 17105-1601
(717) 787-3752 Fax: (717) 783-2070

SOUTH CAROLINA

CLEMSON UNIV.

Robert Muldrow Cooper Library
Public Documents Unit
P.O. Box 343001
Clemson, SC 29634-3001
(803) 656-5174 Fax: (803) 656-3025

UNIV. OF SOUTH CAROLINA

Thomas Cooper Library
Green and Sumter Streets
Columbia, SC 29208
(803) 777-4841 Fax: (803) 777-9503

TENNESSEE

UNIV. OF MEMPHIS LIBRARIES

Govt. Publications Dept.
Memphis, TN 38152-0001
(901) 678-2206 Fax: (901) 678-2511

TEXAS

TEXAS STATE LIBRARY

United States Documents
P.O. Box 12927 - 1201 Brazos
Austin, TX 78701-0001
(512) 463-5455 Fax: (512) 463-5436

TEXAS TECH. UNIV. LIBRARIES

Documents Dept.
Lubbock, TX 79409-0002
(806) 742-2282 Fax: (806) 742-1920

UTAH

UTAH STATE UNIV.

Merrill Library Documents Dept.
Logan, UT 84322-3000
(801) 797-2678 Fax: (801) 797-2677

VIRGINIA

UNIV. OF VIRGINIA

Alderman Library
Govt. Documents
University Ave. & McCormick Rd.
Charlottesville, VA 22903-2498
(804) 824-3133 Fax: (804) 924-4337

WASHINGTON

WASHINGTON STATE LIBRARY

Govt. Publications
P.O. Box 42478
16th and Water Streets
Olympia, WA 98504-2478
(206) 753-4027 Fax: (206) 586-7575

WEST VIRGINIA

WEST VIRGINIA UNIV. LIBRARY

Govt. Documents Section
P.O. Box 6069 - 1549 University Ave.
Morgantown, WV 26506-6069
(304) 293-3051 Fax: (304) 293-6638

WISCONSIN

ST. HIST. SOC. OF WISCONSIN LIBRARY

Govt. Publication Section
816 State Street
Madison, WI 53706
(608) 264-6525 Fax: (608) 264-6520

MILWAUKEE PUBLIC LIBRARY

Documents Division
814 West Wisconsin Avenue
Milwaukee, WI 53233
(414) 286-3073 Fax: (414) 286-8074

Typical Report Citation and Abstract

- ❶ 19970001126 NASA Langley Research Center, Hampton, VA USA
- ❷ Water Tunnel Flow Visualization Study Through Poststall of 12 Novel Planform Shapes
- ❸ Gatlin, Gregory M., NASA Langley Research Center, USA Neuhart, Dan H., Lockheed Engineering and Sciences Co., USA;
- ❹ Mar. 1996; 130p; In English
- ❺ Contract(s)/Grant(s): RTOP 505-68-70-04
- ❻ Report No(s): NASA-TM-4663; NAS 1.15:4663; L-17418; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche
- ❼ To determine the flow field characteristics of 12 planform geometries, a flow visualization investigation was conducted in the Langley 16- by 24-Inch Water Tunnel. Concepts studied included flat plate representations of diamond wings, twin bodies, double wings, cutout wing configurations, and serrated forebodies. The off-surface flow patterns were identified by injecting colored dyes from the model surface into the free-stream flow. These dyes generally were injected so that the localized vortical flow patterns were visualized. Photographs were obtained for angles of attack ranging from 10° to 50°, and all investigations were conducted at a test section speed of 0.25 ft per sec. Results from the investigation indicate that the formation of strong vortices on highly swept forebodies can improve poststall lift characteristics; however, the asymmetric bursting of these vortices could produce substantial control problems. A wing cutout was found to significantly alter the position of the forebody vortex on the wing by shifting the vortex inboard. Serrated forebodies were found to effectively generate multiple vortices over the configuration. Vortices from 65° swept forebody serrations tended to roll together, while vortices from 40° swept serrations were more effective in generating additional lift caused by their more independent nature.
- ❽ Author
- ❾ *Water Tunnel Tests; Flow Visualization; Flow Distribution; Free Flow; Planforms; Wing Profiles; Aerodynamic Configurations*

Key

1. Document ID Number; Corporate Source
2. Title
3. Author(s) and Affiliation(s)
4. Publication Date
5. Contract/Grant Number(s)
6. Report Number(s); Availability and Price Codes
7. Abstract
8. Abstract Author
9. Subject Terms

AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 482)

JANUARY 11, 1999

51

LIFE SCIENCES (GENERAL)

19990004115 Scripps Institution of Oceanography, Marine Biology Research Div., La Jolla, CA USA

An Experimental-Numerical Study of Small Scale Flow Interaction with Bioluminescent Plankton *Final Report, 1 Oct. 1994 - 31 Mar 1998*

Latz, Michael I.; Sep. 04, 1998; 8p; In English

Contract(s)/Grant(s): N00014-95-1-0001

Report No.(s): AD-A353907; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

Numerical and experimental approaches were used to investigate the effects of quantified flow stimuli on bioluminescence stimulation at the small length and time scales appropriate for individual plankton. Bioluminescence was used as a sensitive tool for examining essentially instantaneous organism response. Based on laboratory work with defined flow fields, a consistent picture of organism response emerges. There is a response threshold in laminar flow at a shear stress level of approximately 0.1 N/sq m. Increasing shear stress levels lead to increased population response due to more organisms being stimulated, and to a lesser extent increases in the magnitude of the individual response, which is maximized in high laminar flow. Responsiveness is a function of shear stress, not the laminar or turbulent nature of the flow. The boundary layers of most moving objects of Naval interest contain stimulatory levels of shear stress. The present results indicate that their bioluminescence signature will depend on boundary layer thickness and the amount of flow separation. Project findings are relevant to the concerns of nighttime covert operations, and relate to recent interest in applying hyperspectral and multispectral technologies to ocean surveillance.

DTIC

Plankton; Laminar Flow; Pipe Flow; Bioluminescence; Oceans; Separated Flow; Shear Stress; Stimulation

19990008036 NASA Marshall Space Flight Center, Huntsville, AL USA

Crystallization of Chicken Egg-White Lysozyme from Ammonium Sulfate

Forsythe, Elizabeth L., Universities Space Research Association, USA; Snell, Edward H., NASA Marshall Space Flight Center, USA; Pusey, Marc L., NASA Marshall Space Flight Center, USA; Acta Crystallographica Section D; 1997; ISSN 0907-4449; Volume D53, pp. 795-797; In English; Copyright; Avail: Issuing Activity, Hardcopy, Microfiche

Chicken egg-white lysozyme was crystallized from ammonium sulfate over the pH range 4.0-7.8, with protein concentrations from 100 to 150 mg/ml. Crystals were obtained by vapor-diffusion or batch-crystallization methods. The protein crystallized in two morphologies with an apparent morphology dependence on temperature and protein concentration. In general, tetragonal crystals could be grown by lowering the protein concentration or temperature. Increasing the temperature or protein concentration resulted in the growth of orthorhombic crystals. Representative crystals of each morphology were selected for X-ray analysis. The tetragonal crystals belonged to the P4(sub 3)2(sub 1)2 space group with crystals grown at pH 4.4 having unit-cell dimensions of $a = b = 78.7$ Å, $c = 38.6$ Å and diffracting to beyond 2.0 Å. The orthorhombic crystals, grown at pH 4.8, were of space group P2(sub 1)2(sub 1)2 and had unit-cell dimensions of $a = 30.51$, $b = 56.51$ and $c = 73.62$ Å.

Author

Eggs; Lysozyme; Crystallization; Crystal Growth; Proteins

19990008129 Norwegian Defence Research Establishment, Div. for Environmental Toxicology, Kjeller, Norway

Several Oximes (TOXOGONIN, HI-6 HLO-7, P2S and 2-PAM) Effect on Potassium Evoked Release of [H-3]-Acetylcholine and Liberation of [H-3]-Choline from Rat Hippocampus: The Search for a Therapeutic Agent Against Soman (GD) Poisoning

Oydvin, Ole Kristian, Norwegian Defence Research Establishment, Norway; Jun. 15, 1998; 106p; In English

Contract(s)/Grant(s): FFITOX Proj. 718/137

Report No.(s): FFI/RAPPORT-98/04243; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

The work in this investigation was performed to compare the ability of different oximes to alter the release of acetylcholine from nervous tissue both previous to, and after, inhibition with the cholinesterase inhibitor soman. The aim was to find out which of the oximes used that had the best potential as an antidote against nerve agent intoxication in spite of the absence of reactivation properties of the oximes. The tissue used was rat hippocampi, and the potassium (51 mM) evoked release [H-3]-ACh and the liberation of [H-3]-Ch were measured. The recently developed oxime HLo-7 exerted the strongest effect in the absence of soman closely followed by toxogonin. HI-6 also significantly elevated the stimulated release of [H-3]-ACh, although much less than HLo-7 and toxogonin. Experiments performed following complete inhibition of the cholinesterases showed that HLo-7 induced a significant decrease [H-3] in the amount of released [H-3]-ACh, and an even larger significant increase in the amount of liberated HI-Ch. HI-6 were also shown to exert a quite significant effect although this was only seen in an increased amount of liberated [3-H]-Ch. Toxogonin gave, as for HI-6, some effect on the amount of [H-3]-Ch detected, although this effect was much less pronounced. The pralidoximes (P2S and 2-PAM) showed in all experiments only marginal effects. According to this work, the oxime which seems to have the best potential as an antidote against soman poisoning (due to the significant decrease in amount of stimulated release of [H-3] ACh observed) is HLo-7. HI-6 also seems to have promise. Toxogonin, and the pralidoximes P2S and 2-PAM, did not show any effects comparable to the effects of the two previously mentioned oximes.

Author

Potassium Isotopes; Hydrogen Ions; Research; Acetyl Compounds

19990008371 Meiji Univ., School of Science and Technology, Kawasaki

On the Origin of a Split EPR Signal from a Modified S3'(sub 3)-State of Ca(2+)-Depleted Photosystem II in Plants

Kusunoki, Masami, Meiji Univ.; Research Reports of the School of Science and Technology, Meiji University; 1996; ISSN 0916-4944, No. 14(70), pp. 51-76; In English

Report No.(s): VII-2; No Copyright; Avail: Issuing Activity, Hardcopy, Microfiche

An effective spin hamiltonian that can properly describe the isotropic exchange and magnetic dipolar interactions between a Mn-tetramer with total spin $S(\text{sub } 1) = 1/2$ and its ligand radical with spin $S(\text{sub } 2) = 1/2$, i.e., $J(\text{sub } 12)S(\text{sub } 1)$ central dot $S(\text{sub } 2)I$ and $S(\text{sub } 1)$ central dot $D(\text{sub } 12)$ central dot $S(\text{sub } 2)$ respectively, has been quantum-mechanically derived to elucidate the origin of a new type of EPR signals from the modified-S3'(sub 3) state of Ca(2+)-depleted photosystem II (PS II) membranes. This signal, called "S'(sub 3) signal", is centered at $g = 2.004$ and notably consists of a main doublet component having a near-symmetric lineshape with the linewidth of 100- 200 G and a secondary wing component asymmetrically extending over approx. = 910 G without any hyperfine structure. From results of computer simulation of the S'(sub 3) signal, combined with the pulsed EPR data, it follows: (1) the Mn4-radical complexes in the S'(sub 3) state must be highly inhomogeneous; (2) the majority (approx. = 77 %) would be EPR-silent possibly because of no detectable magnetic moment due to $J(\text{sub } 12)$ much greater than $k(\text{sub } B)T$ (temperature), and (3) the minority would exhibit an EPR signal mainly contributing to the doublet (approx. 15 %) or wing (approx. 8 %) component in the S'(sub 3) signal according as absolute value of $J(\text{sub } 12)$ approx. = 100- 200 G or absolute value of $J(\text{sub } 12)$ much greater than 100-200 G (together with an additional condition, $J(\text{sub } 12)$ less than $k(\text{sub } B)T$, when $J(\text{sub } 12)$ greater than 0), respectively, indicating the radical could be neither an oxidized histidine nor tyrosine $Y(\text{sub } Z, \text{sup } +)$ but some bridging ligand; (5) the doublet component can arise only from the weakly-coupled Mn4-radical complexes satisfying the conditions for a small near-isotropic interaction (absolute value of $J(\text{sub } 12)$ approx = 100-200 G much greater than absolute value of $D(\text{sub } 12)$ and having the tetrameric effective Mn-spins with appreciable hyperfine coupling constants, indicating the radical must form the third asymmetrically-bfiding ligand between di(mu-oxo) bridged Mn(a)(III) and Mn(b)(IV) ions on the opposite side of the other pair of Mn(c)(IV) and Mn(d)(IV) ions in an asymmetric Mn-tetramer whose spin state is approximately given by $\psi(\text{sub } 1)(1/2 M) = \cos \theta(\text{sub } 0)/S(\text{sub } ab)(11/2) M$ greater than $+\sin \theta(\text{sub } 0)/S(\text{sub } ab)(1/2)S(\text{sub } cd)(1)S(\text{sub } 1)(1/2) M$ greater than with $\theta(\text{sub } 0)$ approx. = -62 deg approx. 65 deg, and (7) the radical takes the g -value of ca. 2.011, which is much larger than the free electron g -value ($g(\text{sub } e) = 2.0023$), nearly equal to that of OH center dot (approx. = 2.011) and slightly less than that of $O2(-)$ (approx = 2.015), indicative of an oxygen-rich moiety rather than an aromatic amino acid. These findings, together with the reported stoichiometry of protons released during the normal S-state cycle, evidently suggest that the radical as the primary water-oxidation product would be most likely $(HO(-))(HO(\text{sup } .))$ or $(HOOH(\text{sup } .))(-)$, being bound on the catalytic microsurface of the di(mu-oxo)Mn2(III,IV) subunit in both the normal and the modified S(sub 3) states.

Author

Amino Acids; Computerized Simulation; Hamiltonian Functions; Hyperfine Structure; Magnetic Effects

52
AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and effects of weightlessness on man and animals.

19990004068 Army Aeromedical Research Lab., Fort Rucker, AL USA

The Effects of Exercise as a Countermeasure for Fatigue in Sleep Deprived Aviators *Final Report*

LeDuc, Patricia A., Army Aeromedical Research Lab., USA; Caldwell, John A., Jr., Army Aeromedical Research Lab., USA; Ruyak, Peggy S., Army Aeromedical Research Lab., USA; Prazinko, Brian, Army Aeromedical Research Lab., USA; Gardner, Susan, Army Aeromedical Research Lab., USA; Aug. 1998; 39p; In English

Contract(s)/Grant(s): Proj-30162787A879

Report No.(s): AD-A354133; USAARL-98-35; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This study was designed to examine the efficacy of a nonpharmacological intervention, exercise, for sustaining performance despite a moderate amount of sleep loss. Twelve subjects were individually tested during two, 40-hour periods of sleep deprivation. Volunteers engaged in 10-minute bouts of exercise during one period and rested for an equivalent amount of time during the other period. Data included electroencephalography, Repeated Tests of Sustained Wakefulness, and Visual Analog Scale. Subjective changes in mood were examined using the Profile of Mood States. Cognitive evaluations were measured using the Multi Attribute Task Battery and Synthetic Work Battery. Flight performance was measured using the MINISIM, a flight simulation task. The results of this study indicate that exercise does have short-term alerting effects in sleep deprived subjects. Subjects were more alert immediately following exercise as evidenced by longer latencies to stage 2 sleep than when they did not exercise during sleep deprivation. However, the alerting effects of exercise were very short lived. EEG data collected 50 minutes following exercise or rest showed that exercise facilitated increases in slow-wave activity (signs of decreased alertness) above those seen during rest. Cognitive deficits and slowed reaction times associated with sleep loss were equivalent in both the exercise and rest conditions. Taken together, the results from this study suggest that exercise may ameliorate some of the increases in sleepiness and fatigue associated with sleep loss for a short period of time (30 min) but will not prevent performance decrements. Additionally, less than one hour following exercise, significant increases in fatigue and sleepiness may occur.

DTIC

Sleep Deprivation; Physical Exercise; Alertness; Electroencephalography; Wakefulness; Performance Tests

19990004898 Medical Coll. of Georgia, Augusta, GA USA

Chronic Organophosphorus Exposure and Cognition *Annual Report, 15 Apr. 1996 - 14 Apr 1997*

Buccafusco, Jerry J.; May 1997; 25p; In English

Contract(s)/Grant(s): DAMD17-95-1-5036

Report No.(s): AD-A354416; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Protracted exposure to low levels of organophosphorus (OP) compounds impairs acetylcholine degradation by acetylcholinesterase (AChE) and, in humans, may produce lasting neurotoxicity affecting cognitive function. The present studies examined the ability of such exposure to impair performance of novel or well-learned cognitive-related tasks in rats. Withdrawal from the chronic exposure to a low-dose regimen of diisopropyl- fluorophosphate (DFP, 0.25 mg day/14 days) impaired novel navigational learning acquisition, but did not impair performance of a RE-learning phase of the same task. The DFP regimen also did not significantly impair performance of rats who were well-trained in a delayed discrimination task. These data indicate that performance of memory tasks dependent upon reference concepts is not impaired by OP exposure regimens shown to impair acquisition of novel cognitive tasks prior to the onset of overt toxicity. To help explain the protracted impairment observed during the acquisition of a novel cognitive related task, brains were harvested 7 or 16 days after completion of the DFP or saline (control) regimen and coronal sections were subjected to quantitative muscarinic and nicotinic cholinergic receptor autoradiography. Both muscarinic and nicotinic densities were decreased in several regions in the 7 day sections. By 16 days all differences had resolved except for a continued 42% decrease in hippocampal dentate nicotinic receptor expression. Thus, OP AChE inhibitors may, after chronic low-level exposure, produce a degree of subtle brain damage underlying impaired working memory and reduced expression of hippocampal nicotinic receptor expression.

DTIC

Organic Phosphorus Compounds; Brain Damage; Physiological Effects; Cognition; Acetyl Compounds; Cholinesterase; Degradation; Toxicity

19990005982 Institute for Human Factors TNO, Soesterberg, Netherlands

Motion Sickness: Only One Provocative Conflict? *Interim Report Bewegingsziekte: Slechts een Oorzakelijk Conflict?*

Bles, W., Institute for Human Factors TNO, Netherlands; Bos, J. E., Institute for Human Factors TNO, Netherlands; deGraaf, B.,

Institute for Human Factors TNO, Netherlands; Groen, E., Institute for Human Factors TNO, Netherlands; Wertheim, A. H., Institute for Human Factors TNO, Netherlands; May 27, 1998; 19p; In English
Contract(s)/Grant(s): A92/KLu/331; TNO Proj. 789.3
Report No.(s): TNO-98-A033; TD98-0242; Copyright; Avail: Issuing Activity (TNO Human Factors Research Inst., Kampweg 5, 3769 de Soesterberg, The Netherlands), Hardcopy, Microfiche

In reviewing the various forms of motion sickness the classical sensory rearrangement theory has been redefined by demonstrating that only one type of conflict is necessary and sufficient to explain all different kinds of motion sickness. A mathematical description is provided from the summarizing statement that "All situations which provoke motion sickness are characterized by a condition in which the sensed vertical as determined on the basis of integrated information from the eyes, the vestibular system and the non-vestibular proprioceptors is at variance with the subjective vertical as expected from previous experience".

Author

Motion Sickness; Proprioceptors; Mathematical Models

19990005983 Institute for Human Factors TNO, Soesterberg, Netherlands
Coriolis Effects and Motion Sickness Modelling Interim Report Coriolis Effecten en het Modelleren van Bewegingsziekte
Bles, W., Institute for Human Factors TNO, Netherlands; Mar. 03, 1998; 19p; In English
Contract(s)/Grant(s): A92/KLu/331; TNO Proj. 789.3
Report No.(s): TNO-TM-98-A034; TD98-0243; Copyright; Avail: Issuing Activity (TNO Human Factors Research Inst., Kampweg 5, 3769 De Soesterberg, The Netherlands), Hardcopy, Microfiche

Coriolis effects are notorious in relation to disorientation and motion sickness in aircrew. A review is provided of experimental data on these Coriolis effects, including the modulatory effects of adding visual or somatosensory rotatory motion information. A vector analysis of the consequences of head movements during somatosensory, visual and/or vestibular rotatory motion stimulation revealed that the more the sensed angular velocity vector after the head movements is aligned with the gravito-inertial force vector, the less nauseating effects are experienced. It is demonstrated that this is a special case of the Subjective Vertical conflict theory on motion sickness which assumes that motion sickness may be provoked if a discrepancy is detected between the subjective vertical and the sensed vertical as determined on the basis of incoming sensory information.

Derived from text

Motion Sickness; Sensory Perception; Vertical Motion; Disorientation; Coriolis Effect; Flight Crews; Angular Velocity

19990007752 Defence Science and Technology Organisation, Aeronautical and Maritime Research Lab., Melbourne, Australia
Physical Work and Cognitive Function During Acute Heat Exposure Before and After Heat Acclimation
Patterson, Mark J., Defence Science and Technology Organisation, Australia; Taylor, Nigel A. S., Defence Science and Technology Organisation, Australia; Amos, Denys, Defence Science and Technology Organisation, Australia; Jun. 1998; 39p; In English
Report No.(s): DSTO-TR-0683; DODA-AR-010-569; Copyright; Avail: Issuing Activity (DSTO Aeronautical and Maritime Research Lab., PO Box 4331, Melbourne, Australia), Hardcopy, Microfiche

Eight physically active males, without a history of heat acclimation were studied during heat exposure for 22 consecutive days. Physiological adaptation and cognitive function were evaluated during heat stress tests. Four cognitive function tests were administered at intervals during the study. These tests involved assessment of perceptual function, spatial orientation, temporal orientation and vigilance. The observations show that heat acclimation improves the capacity to perform physical work in the heat. However, neither unfamiliar nor habitual heat strain appear to induce attentional disturbances, temporal or spatial disorientation, or altered visual perception, as quantified within this experimental design. While these data indicate that cognitive function is not affected by heat, it is possible that the cognitive function tests used were not sufficiently sensitive to quantify heat-induced impairment. It is also possible that changes may only appear in more complex cognitive tasks.

Author

Heat Tolerance; Heat Acclimatization; Physical Work; Physiological Responses; Disorientation; Work Functions; Temperature Effects; Stress Measurement; Mental Performance

19990007943 Civil Aeromedical Inst., Oklahoma City, OK USA
The Aeromedical Certification of Photorefractive Keratectomy in Civil Aviation: A Reference Guide Final Report
Nakagawara, Van B., Civil Aeromedical Inst., USA; Wood, Kathryn J., Civil Aeromedical Inst., USA; Sep. 1998; 54p; In English
Contract(s)/Grant(s): AM-B-98-TOX-203
Report No.(s): DOT/FAA/AM-98/25; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The use of surgery to correct refractive errors continues to evolve at a significant pace. Radial keratotomy (RK), the first widely accepted refractive surgical procedure, involves making radial incisions on the peripheral cornea. These incisions weaken

the cornea and allow intraocular pressure to push the peripheral cornea out, flattening the apex and reducing refractive power. There are many disadvantages with RK that raise concerns regarding its use in the aviation environment. These include: progressive hyperopic shifts, reduced corneal strength, fluctuation of vision, glare, poor refractive predictability and altitude-induced corneal changes. In October 1995, the Food and Drug Administration approved the use of the excimer laser to perform photorefractive keratectomy (PRK) to reshape the anterior curvature of the cornea. Since that time, PRK has become the refractive surgical procedure of choice. It has been reported that for low to moderate levels of myopia there is greater predictability, no fluctuation of vision or reduction in corneal strength, and about 85% of patients have uncorrected visual acuity of 20/40 or better. As with RK, there are aspects of PRK that raise concerns about its use in the aviation environment. Some of these include: night vision problems (e.g., glare, halos around lights, haze, starbursts, and dim lighting difficulties), reduced contrast sensitivity, stability of refraction, reduced best-corrected visual acuity, and induced anisometropia. Using a mathematical model, it was estimated that by the year 2000 there may be over 1,200 civil airmen who elect to have PRK performed. To provide the aeromedical community with information to formulate administrative decisions and policies associated with this new refractive surgical procedure, this paper reviews the results of clinical trials on PRK and discusses its applicability in aviation.

Author

Aerospace Medicine; Refractivity; Surgery; Excimer Lasers; Refraction; Cornea

19990008171 Institute of Space Medico-Engineering, Beijing, China

Space Medicine and Medical Engineering (Hangtian Yixue yu Yixue Gongcheng)

Wei, Jinhe, Editor, Institute of Space Medico-Engineering, China; Space Medicine and Medical Engineering; Feb. 1998; ISSN 1002-0837; Volume 11, No. 1; 88p; In English

Report No.(s): PB99-109100; CN 11-2774/R; Copyright Waived; Avail: CASI; A05, Hardcopy; A01, Microfiche

Partial contents: Effect of Hypoxia on Motion Sickness Induced by Optokinetic Stimulation (In English); A study on EEG - Encephalofluorographic Characteristics in alpha Frequency Band in Pilots; Studies on the Solvent Structure in Protein Crystals Grown in Microgravity; Application of the Sphygmogram in Evaluation of Pilots Cardiovascular Function in Resting Condition; Analysis of Heart Rate Variability in Chinese Healthy Pilot; Reliability Design and Analysis of Man - Machine Performance of Display and Illumination System in Cockpit.

NTIS

Aerospace Medicine; Hypoxia; Electroencephalography; Solvents; Heart Rate; Reliability

19990008218 Institute of Space Medico-Engineering, Beijing, China

Space Medicine and Medical Engineering (Hangtian Yixue yu Yixue Gongcheng)

Wei, Jinhe, Editor, Institute of Space Medico-Engineering, China; Space Medicine and Medical Engineering; Dec. 1997; ISSN 1002-0837; Volume 10, No. 6, pp. 390-468; In English

Report No.(s): PB99-108987; CN 11-2774/R; Copyright Waived; Avail: CASI; A06, Hardcopy; A02, Microfiche

Partial contents: Dual Reciprocity Boundary Element Method for Solving Thermal Wave Model of Bioheat Transfer (In English); An Analysis of Radiation Risk for Manned Space Flight in Low - earth Orbits with Medium Inclination; Observation of EEG Parameters during - 6(sup astr.) Head - down Bedrest for 21 Days; Simulation of a Decoupling Generalized Predictive Control Algorithm for Temperature-humidity System; A Study on Three Dimensional Modeling of Human Body in Man - machine System Simulation.

NTIS

Aerospace Medicine; Boundary Element Method

19990008220 Institute of Space Medico-Engineering, Beijing, China

Space Medicine and Medical Engineering (Hangtian Yixue yu Yixue Gongcheng)

Wei, Jinhe, Editor, Institute of Space Medico-Engineering, China; Space Medicine and Medical Engineering; Apr. 1998; ISSN 1002-0837; Volume 11, No. 2, pp. 79-156; In English

Report No.(s): PB99-109092; CN 11-2774/R; Copyright Waived; Avail: CASI; A05, Hardcopy; A01, Microfiche

Partial contents: Alteration of Vasoreactivity of Mesenteric Arteries in Rats after Two-Week Simulated Weightlessness (In English); An Internet Based Medical Communication Server; Bispectral Analysis of EEG Signal during Focal Cerebral Ischemia; Study on Comprehensive Assessment in Selection of Special Work Personnel; Effects of Hypoxia and Quigong on Urine Malondialdehyde, Superoxide Dismutase and Circulating Endothelial Cell in Humans during Simulated Weightlessness.

NTIS

Aerospace Medicine; Arteries; Internets

BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

19990004134 Texas Univ., Center for Vision and Image Sciences, Austin, TX USA

Local Spatio-Temporal Analysis in Vision Systems *Final Report, 1 May 1993 - 31 May 1998*

Geisler, W. S.; Bovik, A. C.; Cormack, L. K.; Gilden, D. L.; Super, B. J.; Sep. 1998; 29p; In English

Contract(s)/Grant(s): F49620-9301-0307

Report No.(s): AD-A353750; AFRL-SR-BL-TR-98-0641; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This is the final progress report of the vision group at the University of Texas under support of AFOSR URI grant F49620-93-1-0307. In this report we will attempt to summarize the major accomplishments over the previous 5 years. Aim 1: to develop a mathematical model of the initial stages of visual processing (the front end mechanisms), based upon a wide range of physiological and psychophysical data. Aim 2: to develop new methods and models of local frequency coding. Aim 3: to develop new mathematical models and computer-vision algorithms for performing complex visual tasks that are based upon local frequency coding representations. Aim 4: to develop models for human performance in complex visual tasks that build upon current understanding of the front-end mechanisms. Aim 5: to develop a computational testbed for implementing, comparing, integrating and visualizing the different models and modules developed during the project, using a massively parallel machine and graphics workstation front-end.

DTIC

Mathematical Models; Visual Perception; Computer Vision; Parallel Processing (Computers); Physiology; Visual Tasks

19990004630 Civil Aeromedical Inst., Oklahoma City, OK USA

Summative Evaluation of the Collegiate Training Initiative for Air Traffic Control Specialists Program: Progress of Minnesota Air Traffic Control Training Center Graduates in En Route Field Training *Final Report*

Broach, Dana, Civil Aeromedical Inst., USA; Aug. 1998; 70p; In English

Contract(s)/Grant(s): FAA-AAM-97-B-HRR-133

Report No.(s): DOT/FAA/AM-98/22; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

This summative evaluation of the Collegiate Training Initiative for Air Traffic Control Specialists focused on the progress of the Minnesota Air Traffic Control Training Center (MnATCTC) graduates in en route field training. The evaluation compared 136 MnATCTC graduates with 157 FAA Academy graduates on 4 classes of measures: (a) diversity; (b) progress in training at the first assigned field facility; (c) attrition from the first assigned field facility; and (d) performance ratings at the first assigned facility. A cost-benefit analysis for the MnATCTC program was also conducted. There were significantly more women in the MnATCTC (40%) than in the FAA Academy group (17%); there were no significant differences in minority representation. Just 17% of the MnATCTC had achieved full performance level (FPL) certification as of June 1995, compared with 69% of the FAA Academy group. However, time to FPL and attrition rates were similar. MnATCTC graduates were rated significantly lower than FAA Academy graduates by supervisors in teamwork, technical skill, technical knowledge, and overall potential to succeed in the ATCS occupation. Cost analysis found that MnATCTC per-hire costs would be competitive with FAA Academy costs-per-student by FYI 998-2000. Cost-benefit analysis found that the MnATCTC would begin returning about \$1.45 in avoided costs and savings to the agency for every \$1 invested by FY1998-2001, even with continued FAA financial support. However, with a maximum capacity of about 100 graduates per year, the MnATCTC can provide only a small fraction of the FAA controller workforce. In summary, this evaluation found that the MnATCTC program appears to be achieving its stated goals.

Author

Training Evaluation; Air Traffic Controllers (Personnel); Students; Education; Certification

19990007903 NASA Ames Research Center, Moffett Field, CA USA

Rotational Translational Components of Motion Parallax: Observers' Sensitivity and Implications for Three-Dimensional Computer Graphics

Kaiser, Mary K., NASA Ames Research Center, USA; Montegut, Michael J., NASA Ames Research Center, USA; Proffitt, Dennis R., Virginia Univ., USA; Journal of Experimental Psychology: Applied; 1995; Volume 1, No. 4, pp. 321-331; In English; No Copyright; Avail: Issuing Activity, Hardcopy, Microfiche

The motion of objects during motion parallax can be decomposed into 2 observer-relative components: translation and rotation. The depth ratio of objects in the visual field is specified by the inverse ratio of their angular displacement (from translation) or equivalently by the inverse ratio of their rotations. Despite the equal mathematical status of these 2 information sources, it was predicted that observers would be far more sensitive to the translational than rotational component. Such a differential sensitivity

is implicitly assumed by the computer graphics technique billboard, in which 3-dimensional (3-D) objects are drawn as planar forms (i.e., billboards) maintained normal to the line of sight. In 3 experiments, observers were found to be consistently less sensitive to rotational anomalies. The implications of these findings for kinetic depth effect displays and billboard techniques are discussed.

Author

Parallax; Translational Motion; Visual Fields; Computer Graphics

54

MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing. For related information see also 16 Space Transportation.

19990004380 Colorado Univ., Boulder, CO USA

Modeling, Monitoring and Fault Diagnosis of Spacecraft Air Contaminants *Final Report*

Ramirez, W. Fred, Colorado Univ., USA; Skliar, Mikhail, Colorado Univ., USA; Narayan, Anand, Colorado Univ., USA; Morgenthaler, George W., Colorado Univ., USA; Smith, Gerald J., Colorado Univ., USA; 1998; 160p; In English

Contract(s)/Grant(s): NAGw-4585; No Copyright; Avail: CASI; A08, Hardcopy; A02, Microfiche

Control of air contaminants is a crucial factor in the safety considerations of crewed space flight. Indoor air quality needs to be closely monitored during long range missions such as a Mars mission, and also on large complex space structures such as the International Space Station. This work mainly pertains to the detection and simulation of air contaminants in the space station, though much of the work is easily extended to buildings, and issues of ventilation systems. Here we propose a method with which to track the presence of contaminants using an accurate physical model, and also develop a robust procedure that would raise alarms when certain tolerance levels are exceeded. A part of this research concerns the modeling of air flow inside a spacecraft, and the consequent dispersal pattern of contaminants. Our objective is to also monitor the contaminants on-line, so we develop a state estimation procedure that makes use of the measurements from a sensor system and determines an optimal estimate of the contamination in the system as a function of time and space. The real-time optimal estimates in turn are used to detect faults in the system and also offer diagnoses as to their sources. This work is concerned with the monitoring of air contaminants aboard future generation spacecraft and seeks to satisfy NASA's requirements as outlined in their Strategic Plan document (Technology Development Requirements, 1996).

Derived from text

Simulation; Models; Air Pollution; Monitors; Space Stations; Air Quality

19990004396 Federal Aviation Administration, William J. Hughes Technical Center, Atlantic City, NJ USA

Design Review of the Controller-Pilot Data Link Communications: Build 1 (CPDLC-1) Functionality and Computer-Human Interface for the Display System Replacement *Final Report*

Darby, Evan R., Jr.; Shingledecker, Clark; Aug. 1998; 52p; In English

Report No.(s): AD-A353997; DOT/FAA/CT-98/16; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

This report documents the results of a controller design review of the proposed functionality and computer-human interface for Controller-Pilot Data Link Communications Build 1 (CPDLC-1) planned for implementation on the Display System Replacement (DSR).

DTIC

Human Factors Engineering; Data Links; Controllers; Human-Computer Interface

19990004399 Analytic Sciences Corp., San Antonio, TX USA

Analysis of CARDlab Data for Interpupillary and Vertex Distance: Notes on the Construction of an "Eye-box" *Final Report, Aug. 1997 - Feb. 1998*

Schmeisser, Elmar T.; Maier, Dennis A.; Jul. 1998; 17p; In English

Contract(s)/Grant(s): F41624-97-D-9000; AF Proj. 7757

Report No.(s): AD-A354014; AFRL-HE-BR-TR-1998-0047; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Data was obtained from the Wright-Patterson Air Force Base Computerized Anthropometric Research and Design lab (CARDLab) describing the quantitative three dimensional location of various facial landmarks. This data was compared to a set

of similar measurements made in clinical optometric practice. The values obtained were analyzed for their statistical distribution. These values can be used to predict the fit of eye centered protective eyewear designs.

DTIC

Anthropometry; Computer Programs; Ear Protectors

19990005986 Institute for Human Factors TNO, Soesterberg, Netherlands

A Digital Visual Distinctness Metric Interim Report Een Digitale Visuele Opvallendheidsmaat

Toet, A., Institute for Human Factors TNO, Netherlands; Martinez-Beana, J., Granada Univ., Spain; Jun. 08, 1998; 32p; In English; Original contains color illustrations

Contract(s)/Grant(s): A98/KL/316; TNO Proj. 786.1

Report No.(s): TNO-TM-98-A037; TD98-0246; Copyright; Avail: Issuing Activity (TNO Human Factors Research Inst., Kampweg 5, 3769 De Soesterberg, The Netherlands), Hardcopy, Microfiche

This report presents a new computational visual distinctness metric based on principles of the early human visual system. The metric is applied to quantify (a) the visual distinctness of targets in complex natural scenes, and (b) the perceptual differences between compressed and uncompressed images. The new metric is shown (i) to predict human observer performance in search and detection tasks on complex natural imagery, (ii) to correlate with visual target distinctness estimated by human observers, and (iii) to correlate with the quality factor of JPEG compressed imagery.

Author

Human Performance; Estimating; Imagery

19990007754 Defence Science and Technology Organisation, Aeronautical and Maritime Research Lab., Melbourne, Australia
Electrostatic Properties of the Army Combat Soldier Ensemble Garments

Billon, H., Defence Science and Technology Organisation, Australia; Bajinskis, G., Defence Science and Technology Organisation, Australia; Apr. 1998; 44p; In English

Report No.(s): DSTO-TR-0664; DODA-AR-010-531; Copyright; Avail: Issuing Activity (DSTO, Aeronautical and Maritime Research Lab., PO Box 4331, Melbourne, Victoria 3001, Australia), Hardcopy, Microfiche

The electrostatic properties of the combat ensemble worn by Australian soldiers have been assessed. The resistance-to-ground, capacitance-to-ground, peak potential, peak energy and decay times were measured for a subject wearing various garment combinations. It was found that under favourable conditions a subject wearing the garments can generate sufficient energy to initiate electro-explosive devices, damage electronic devices and ignite fuel/air mixtures. However the threat level is dependent on the operational scenario and a threat analysis is required to determine the hazard for any given situation.

Author

Electrostatics; Garments; Assessments; Potential Energy; Combat

19990007858 FGAN, Research Inst. for Electronics and Mathematics, Wachtberg-Werthhoven, Germany

Investigation of Human Performance Monitoring an IR-Camera View from an Unmanned Tactical Aircraft

Gaertner, Klaus-Peter, FGAN, Germany; Krueger, Walther, FGAN, Germany; Jul. 1998; 6p; In English; Also announced as 19990007836; Copyright Waived; Avail: CASI; A02, Hardcopy; A03, Microfiche

Man-machine system performance on target designation and tracking tasks can be influenced by the design of the manual control subsystem including characteristics of the control device. An experimental set-up simulates the control station of a human operator monitoring a computer display which shows the stabilized TV-camera view out of an unmanned aerial vehicle flying at low altitude. Using a hand-grip controlstick the operator can control the direction of the missile's camera to facilitate the designation of a target. After "lock on", further tracking of the target is made by an automatic tracking system. The operator has to monitor the tracker function and to make corrections if necessary. Target designation by the operator becomes a critical task because the camera system has a narrow field of view to enhance good recognition. Thus target images move towards display edges in a short time. So the target designation task has to be fast and reliable. to achieve near optimum operator performance three different types of control sticks are used and compared in an experiment: (1) a moveable stick (displacement), (2) a stiff stick (hybrid force), and (3) an unmoveable stick (pure force). Additionally the sensitivity, i.e. the gain of the control signal, is being varied including a non-linear relationship. Results of a test series conducted comparing linear and non-linear control gain showed no significant differences on performing the target acquisition task.

Author

Control Systems Design; Man Machine Systems; Manual Control; Operator Performance; Human-Computer Interface; Control Simulation; Control Sticks

19990007886 Research and Technology Organization, Human Factors and Medicine Panel, Neuilly-sur-Seine, France
Alternative Control Technologies: Human Factors Issues *Techniques de Pilotage Alternatives: Le Facteur Humain*
Oct. 1998; 116p; In English; Alternative Control Technologies: Human Factors Issues, 7-8 Oct. 1998, Bretigny, Wright-Patterson AFB, OH, France, USA; Also announced as 19990007887 through 19990007895
Report No.(s): RTO-EN-3; AC/323(HFM)TP/1; ISBN 92-837-1003-7; Copyright Waived; Avail: CASI; A06, Hardcopy; A02, Microfiche

With the increasing intelligence of computer systems, it is becoming more desirable to have an operator communicate with machines rather than simply operate them. In combat aircraft, this need to communicate is made quite crucial due to high temporal pressure and workload during critical phases of the flight (ingress, engagement, deployment of self-defence). The HOTAS concept, with manual controls fitted on the stick and throttle, has been widely used in modern fighters such as F16, F18, EFA and Rafale. This concept allows pilots to input real time commands to the aircraft system. However, it increases the complexity of the pilot task due to inflation of real time controls, with some controls being multifunction. It is therefore desirable, in the framework of "ecological interfaces", to introduce alternative input channels in order to reduce the complexity of manual control in the HOTAS concept and allow more direct and natural access to the aircraft systems. Control and display technologies are the critical enablers for these advanced interfaces. There are a variety of novel alternative control technologies that when integrated usefully with critical mission tasks can make natural use of the innate potential of human sensory and motor systems. Careful design and integration of candidate control technologies will result in human-machine interfaces which are natural, easier to learn, easier to use, and less prone to error. Significant progress is being made on using signals from the brain, muscles, voice, lip, head position, eye position and gestures for the control of computers and other devices. Judicious application of alternative control technologies has the potential to increase the bandwidth of operator-system interaction, improve the effectiveness of military systems, and realise cost savings. Alternative controls can reduce workload and improve efficiency within the cockpit, directly supporting the war-fighter. by the end of 1997, WG 25 had extensively reviewed human factor aspects of current and prospective alternative technologies along with operational needs and integration issues. Dissemination of the knowledge among Engineering and Human Factor communities has to be made as early as possible to facilitate implementation of these new technologies in future projects.

Author

Human Factors Engineering; Man Machine Systems; Manual Control; Artificial Intelligence; Control Equipment; Automatic Control; Control Systems Design; Real Time Operation

19990007887 Defence Evaluation Research Agency, Systems Integration Dept., Farnborough, UK
Operational Rationale and Related Issues for Alternative Control Technologies

Rood, G. M., Defence Evaluation Research Agency, UK; Alternative Control Technologies: Human Factors Issues; Oct. 1998; 8p; In English; Also announced as 19990007886; Copyright Waived; Avail: CASI; A02, Hardcopy; A02, Microfiche

The demanding operations in the current generations of fixed and rotary wing aircraft, particularly at night and in poor weather, have increased the need for more 'eyes-out' operations, which decreases the time for 'head down' or 'head in' viewing time, both for switching operations and for assimilation of information from head down displays. Similarly the speed of operations has led to less time being available for these two operations. Progress has been made towards the assimilation of visual display data through the move towards Helmet Mounted Displays and the time reductions in switching have been achieved through ensuring that the pilot has no need to move his hands from the primary aircraft controls during high workload periods by the use of the Hands On Throttle And Stick (HOTAS) concept. Using Fitts Law, namely that the time to move the hand to a target (in this case a switch or button) depends only upon the relative precision required, indicates that the movement time - a summed combination of perceptual processing, cognitive processing and motor processing - is in the region of 250 ms (an aircraft moving at 500 knots travels in the region of 80 metres in this time). Thus a time saving of around 250 msec is achievable by minimising the hand movements. This generally involves the provision of all of the necessary manual switches on either the throttle top or the control column (stick) top, (HOTAS) or Hands On Collective and Cyclic (HOCAC) - for helicopters - during all critical flight operations.

Derived from text

Aircraft Control; Helmet Mounted Displays; Workloads (Psychophysiology); Flight Operations; Control Systems Design; Human Factors Engineering

19990007888 Air Force Research Lab., Information Analysis and Exploitation Branch, Wright-Patterson AFB, OH USA
The Technology of Speech-Based Control

Anderson, Timothy R., Air Force Research Lab., USA; Oct. 1998; 10p; In English; Also announced as 19990007886; Copyright Waived; Avail: CASI; A02, Hardcopy; A02, Microfiche

This lecture will present an overview of current speech recognition/control technology being utilized for aerospace applications. Common approaches in the areas of signal acquisition, signal processing, and pattern matching will be presented. Pattern matching algorithms for speech recognition/control can be characterized as pattern recognition approaches and acoustic phonetic approaches. The most common pattern recognition approaches used today are the hidden Markov model (HMM) and neural network. The strengths and weakness of the various approaches will be examined.

Author

Speech Recognition; Control Systems Design; Neural Nets; Control Equipment; Voice Control; Artificial Intelligence

19990007889 Applied Science Labs., Bedford, MA USA

Technology and Application of Gaze Based Control

Borah, Joshua, Applied Science Labs., USA; Oct. 1998; 10p; In English; Also announced as 19990007886; Copyright Waived; Avail: CASI; A02, Hardcopy; A02, Microfiche

This lecture reviews the potential use of gaze measurement as a means of human interaction with computers and other systems, especially in the military aerospace environment. It addresses the reasons for considering gaze control, reviews techniques for measuring gaze; and discusses physiological, behavioral, and practical considerations for design of gaze based controls.

Author

Control Systems Design; Human-Computer Interface; Eye Movements; Control Equipment; Active Control; Vision

19990007890 Air Force Research Lab., Wright-Patterson AFB, OH USA

The Technology and Applications of Gesture-Based Control

McMillan, Grant R., Air Force Research Lab., USA; Oct. 1998; 12p; In English; Also announced as 19990007886; Copyright Waived; Avail: CASI; A03, Hardcopy; A02, Microfiche

This lecture reviews the technology for using hand, body and facial gestures as a means for interacting with computers and other physical devices. It discusses the rationale for gesture-based control technology, methods for acquiring and processing such signals from human operators, applications of these control technologies, and anticipated future developments.

Author

Control Equipment; Technology Utilization; Human-Computer Interface; Human Body; Control Systems Design

19990007891 Air Force Research Lab., Information Analysis and Exploitation Branch, Wright-Patterson AFB, OH USA

Applications of Speech-Based Control

Anderson, Timothy R., Air Force Research Lab., USA; Oct. 1998; 10p; In English; Also announced as 19990007886; Copyright Waived; Avail: CASI; A02, Hardcopy; A02, Microfiche

This lecture will examine many applications of speech based control in aerospace environments. Applications of speech recognition in fixed and rotary wing aircraft as well as in space and command and control will be discussed. Current performance of the technology and application problems will be presented. The lecture concludes with a discussion of required enhancements for aerospace applications.

Author

Speech Recognition; Voice Control; Control Systems Design; Control Equipment; Command and Control; Man Machine Systems

19990007892 Applied Science Labs., Bedford, MA USA

Technology and Application of Head Based Control

Borah, Joshua, Applied Science Labs., USA; Oct. 1998; 12p; In English; Also announced as 19990007886; Copyright Waived; Avail: CASI; A03, Hardcopy; A02, Microfiche

This lecture reviews the use of head position and orientation as a means for human interaction with computers and other systems, especially in the military aerospace environment. It addresses the reasons for using head based control, current measurement technology, relevant physiological and behavioral factors, and the uses of head based control to date.

Author

Aircraft Control; Control Equipment; Control Systems Design; Automatic Control; Head Movement; Human-Computer Interface

19990007893 Air Force Research Lab., Wright-Patterson AFB, OH USA

The Technology and Applications of Biopotential-Based Control

McMillan, Grant R., Air Force Research Lab., USA; Oct. 1998; 12p; In English; Also announced as 19990007886; Copyright Waived; Avail: CASI; A03, Hardcopy; A02, Microfiche

This lecture reviews the technology for using electrical signals from the muscles and brain as a means for interacting with computers and other physical devices. It discusses the rationale for biopotential-based control technology, methods for acquiring and processing such signals from human operators, applications of these control technologies, and anticipated future developments.

Author

Brain; Muscles; Control Equipment; Human-Computer Interface; Control Systems Design; Electric Pulses

19990007894 Defence Evaluation Research Agency, Systems Integration Dept., Farnborough, UK

Human Factors Issues for the Integration of Alternative Control Technologies

Rood, G. M., Defence Evaluation Research Agency, UK; Oct. 1998; 8p; In English; Also announced as 19990007886; Copyright Waived; Avail: CASI; A02, Hardcopy; A02, Microfiche

The introduction of Alternative Control Technologies (ACTs), and their closer links with human natural behaviour, will require a better balance between the human factors requirements and the aircraft integration engineering issues. Successful integration of ACTs into aircraft systems should provide significant operational advantages, and the following paragraphs discuss an approach for the necessary balance of human factors and engineering.

Author

Human Factors Engineering; Aircraft Control; Control Systems Design; Human-Computer Interface; Automatic Control

19990007895 Sextant Avionique, Saint Medard en Jalles, France

Synthesis- and Expected Benefit Analysis

Leger, Alain, Sextant Avionique, France; Oct. 1998; 10p; In English; Also announced as 19990007886; Copyright Waived; Avail: CASI; A02, Hardcopy; A02, Microfiche

A synthetic approach of the various Alternative Control Technologies is proposed, taking into account advantages and inconveniences for military aircraft applications. Operational rationale, classification of technologies following capabilities and degree of maturity, summary of main functional characteristics and integration issues are critically reviewed. A brief presentation of multimodal dialog issues is also presented. Finally, a tentative investigation of potential areas of benefits for military aircraft design and operation is conducted.

Author

Control Systems Design; Human-Computer Interface; Human Factors Engineering; Aircraft Control; Automatic Control

55

SPACE BIOLOGY

Includes exobiology; planetary biology; and extraterrestrial life.

19990004118 Sulfonics, Inc., Alachua, FL USA

Reconstructing Ancient Forms of Life *Quarterly Report*

Benner, Steven A., Sulfonics, Inc., USA; Mar. 10, 1998; 43p; In English; Sponsored in part by the Deutsche Akademische Austauschdienst

Contract(s)/Grant(s): NAS5-97210

Report No.(s): NASA/CR-1998-208599; NAS 1.26:208599; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Progress in the past three months has occurred in two areas, reconstruction of ancestral proteins and improved understanding of chemical features that are likely to be universal in generic matter regardless of its genesis. Ancestral ribonucleases have been reconstructed, and an example has been developed that shows how physiological function can be assigned to in vitro behaviors observed in biological systems. Sequence data have been collected to permit the reconstruction of src homology 2 domains that underwent radiative divergence at the time of the radiative divergence of chordates. New studies have been completed that show how genetic matter (or its remnants) might be detected on Mars (or other non-terrestrial locations.) Last, the first in vitro selection experiments have been completed using a nucleoside library carrying positively charged functionality, illustrating the importance of non-standard nucleotides to those attempting to obtain evidence for an "RNA world" as an early episode of life on earth.

Author

Life Sciences; Ribonucleic Acids; Nucleosides; Physiology; Genetics; Nucleotides

Subject Term Index

A

ACETYL COMPOUNDS, 2, 3
ACTIVE CONTROL, 10
AEROSPACE MEDICINE, 5
AIR POLLUTION, 7
AIR QUALITY, 7
AIR TRAFFIC CONTROLLERS (PERSONNEL), 6
AIRCRAFT CONTROL, 9, 10, 11
ALERTNESS, 3
AMINO ACIDS, 2
ANGULAR VELOCITY, 4
ANTHROPOMETRY, 8
ARTERIES, 5
ARTIFICIAL INTELLIGENCE, 9, 10
ASSESSMENTS, 8
AUTOMATIC CONTROL, 9, 10, 11

B

BIOLUMINESCENCE, 1
BOUNDARY ELEMENT METHOD, 5
BRAIN, 11
BRAIN DAMAGE, 3

C

CERTIFICATION, 6
CHOLINESTERASE, 3
COGNITION, 3
COMBAT, 8
COMMAND AND CONTROL, 10
COMPUTER GRAPHICS, 7
COMPUTER PROGRAMS, 8
COMPUTER VISION, 6
COMPUTERIZED SIMULATION, 2
CONTROL EQUIPMENT, 9, 10, 11
CONTROL SIMULATION, 8
CONTROL STICKS, 8
CONTROL SYSTEMS DESIGN, 8, 9, 10, 11
CONTROLLERS, 7
CORIOLIS EFFECT, 4
CORNEA, 5
CRYSTAL GROWTH, 1
CRYSTALLIZATION, 1

D

DATA LINKS, 7
DEGRADATION, 3
DISORIENTATION, 4

E

EAR PROTECTORS, 8
EDUCATION, 6
EGGS, 1
ELECTRIC PULSES, 11
ELECTROENCEPHALOGRAPHY, 3, 5
ELECTROSTATICS, 8
ESTIMATING, 8
EXCIMER LASERS, 5
EYE MOVEMENTS, 10

F

FLIGHT CREWS, 4
FLIGHT OPERATIONS, 9

G

GARMENTS, 8
GENETICS, 11

H

HAMILTONIAN FUNCTIONS, 2
HEAD MOVEMENT, 10
HEART RATE, 5
HEAT ACCLIMATIZATION, 4
HEAT TOLERANCE, 4
HELMET MOUNTED DISPLAYS, 9
HUMAN BODY, 10
HUMAN FACTORS ENGINEERING, 7, 9, 11
HUMAN PERFORMANCE, 8
HUMAN-COMPUTER INTERFACE, 7, 8, 10, 11
HYDROGEN IONS, 2
HYPERFINE STRUCTURE, 2
HYPOXIA, 5

I

IMAGERY, 8
INTERNETS, 5

L

LAMINAR FLOW, 1
LIFE SCIENCES, 11
LYSOZYME, 1

M

MAGNETIC EFFECTS, 2
MAN MACHINE SYSTEMS, 8, 9, 10
MANUAL CONTROL, 8, 9
MATHEMATICAL MODELS, 4, 6
MENTAL PERFORMANCE, 4
MODELS, 7
MONITORS, 7
MOTION SICKNESS, 4
MUSCLES, 11

N

NEURAL NETS, 10
NUCLEOSIDES, 11
NUCLEOTIDES, 11

O

OCEANS, 1
OPERATOR PERFORMANCE, 8
ORGANIC PHOSPHORUS COMPOUNDS, 3

P

PARALLAX, 7
PARALLEL PROCESSING (COMPUTERS), 6
PERFORMANCE TESTS, 3
PHYSICAL EXERCISE, 3
PHYSICAL WORK, 4
PHYSIOLOGICAL EFFECTS, 3
PHYSIOLOGICAL RESPONSES, 4
PHYSIOLOGY, 6, 11
PIPE FLOW, 1
PLANKTON, 1
POTASSIUM ISOTOPES, 2

POTENTIAL ENERGY, 8
PROPRIOCEPTORS, 4
PROTEINS, 1

R

REAL TIME OPERATION, 9
REFRACTION, 5
REFRACTIVITY, 5
RELIABILITY, 5
RESEARCH, 2
RIBONUCLEIC ACIDS, 11

S

SENSORY PERCEPTION, 4
SEPARATED FLOW, 1
SHEAR STRESS, 1
SIMULATION, 7
SLEEP DEPRIVATION, 3
SOLVENTS, 5
SPACE STATIONS, 7
SPEECH RECOGNITION, 10
STIMULATION, 1
STRESS MEASUREMENT, 4
STUDENTS, 6
SURGERY, 5

T

TECHNOLOGY UTILIZATION, 10
TEMPERATURE EFFECTS, 4
TOXICITY, 3
TRAINING EVALUATION, 6
TRANSLATIONAL MOTION, 7

V

VERTICAL MOTION, 4
VISION, 10
VISUAL FIELDS, 7
VISUAL PERCEPTION, 6
VISUAL TASKS, 6
VOICE CONTROL, 10

W

WAKEFULNESS, 3
WORK FUNCTIONS, 4
WORKLOADS (PSYCHOPHYSIOLOGY), 9

Personal Author Index

A

Amos, Denys, 4
Anderson, Timothy R., 9, 10

B

Bajinskis, G., 8
Benner, Steven A., 11
Billon, H., 8
Bles, W., 3, 4
Borah, Joshua, 10
Bos, J. E., 3
Bovik, A. C., 6
Broach, Dana, 6
Buccafusco, Jerry J., 3

C

Caldwell, John A., Jr., 3
Cornack, L. K., 6

D

Darby, Evan R., Jr., 7
deGraaf, B., 3

F

Forsythe, Elizabeth L., 1

G

Gaertner, Klaus-Peter, 8
Gardner, Susan, 3
Geisler, W. S., 6
Gilden, D. L., 6
Groen, E., 4

K

Kaiser, Mary K., 6
Krueger, Walther, 8
Kusunoki, Masami, 2

L

Latz, Michael I., 1
LeDuc, Patricia A., 3
Leger, Alain, 11

M

Maier, Dennis A., 7
Martinez-Beana, J., 8
McMillan, Grant R., 10
Montegut, Michael J., 6
Morgenthaler, George W., 7

N

Nakagawara, Van B., 4
Narayan, Anand, 7

O

Oydvin, Ole Kristian, 1

P

Patterson, Mark J., 4
Prazinko, Brian, 3
Proffitt, Dennis R., 6
Pusey, Marc L., 1

R

Ramirez, W. Fred, 7
Rood, G. M., 9, 11
Ruyak, Peggy S., 3

S

Schmeisser, Elmar T., 7
Shingledecker, Clark, 7
Skliar, Mikhail, 7
Smith, Gerald J., 7
Snell, Edward H., 1
Super, B. J., 6

T

Taylor, Nigel A. S., 4
Toet, A., 8

W

Wei, Jinhe, 5
Wertheim, A. H., 4
Wood, Kathryn J., 4

REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.				
1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE January 11, 1999		3. REPORT TYPE AND DATES COVERED Special Publication
4. TITLE AND SUBTITLE Aerospace Medicine and Biology A Continuing Bibliography (Supplement 482)			5. FUNDING NUMBERS	
6. AUTHOR(S)				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) NASA Scientific and Technical Information Program Office			8. PERFORMING ORGANIZATION REPORT NUMBER NASA/SP-1998-7011/Suppl482	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) National Aeronautics and Space Administration Langley Research Center Hampton, VA 23681			10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES				
12a. DISTRIBUTION/AVAILABILITY STATEMENT Subject Category: Availability: NASA CASI (301) 621-0390			12b. DISTRIBUTION CODE Unclassified--Unlimited Subject Category - 52	
13. ABSTRACT (Maximum 200 words) This report lists reports, articles and other documents recently announced in the NASA STI Database.				
14. SUBJECT TERMS Aerospace Medicine Bibliographies Biological Effects			15. NUMBER OF PAGES 28	
			16. PRICE CODE A03/HC	
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT		20. LIMITATION OF ABSTRACT